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The effect of hypnotic suggestion on unaided visual acuity

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The effect of hypnotic suggestion on unaided visual acuity

Abstract

The effect of hypnotic suggestion and relaxation on myopic subjects' unaided visual acuity was assessed. Three groups, one control and two experimental, consisting of myopes of similar refractive error and hypnotic suggestibility, were evaluated. All groups showed significant levels of visual acuity improvement within themselves. Hypnotic (suggestive) relaxation used in experimental group 1 and experimental group 2 yielded a significant increase in acuity over the control. Specific hypnotic suggestion of improved vision used in experimental group 2 only had no significant effect on acuity. Monitoring of the refractive state of all subjects was done to assure that optical changes could not be used as an explanation for the post-induction acuity increases. The relevance of these findings to both patient and practitioner is discussed. Pertinent literature is reviewed.

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THE EFFECT OF HYPNOTIC SUGGESTION
ON UNAIDED VISUAL ACUITY

BY
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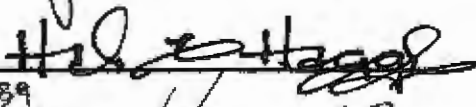
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Pacific University College of Optometry
February 8, 1980

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SENIOR RESEARCH IN PARTIAL FULFILLMENT
OF DOCTOR OF OPTOMETRY DEGREE



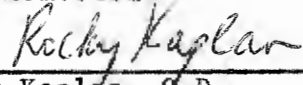
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ABSTRACT

The effect of hypnotic suggestion and relaxation on myopic subjects' unaided visual acuity was assessed. Three groups, one control and two experimental, consisting of myopes of similar refractive error and hypnotic suggestibility, were evaluated. All groups showed significant levels of visual acuity improvement within themselves. Hypnotic (suggestive) relaxation used in experimental group 1 and experimental group 2 yielded a significant increase in acuity over the control. Specific hypnotic suggestion of improved vision used in experimental group 2 only had no significant effect on acuity. Monitoring of the refractive state of all subjects was done to assure that optical changes could not be used as an explanation for the post-induction acuity increases. The relevance of these findings to both patient and practitioner is discussed. Pertinent literature is reviewed.

INTRODUCTION

Hypnosis is the study and application of controlled suggestion.² It is a form of heightened suggestibility⁷ and has been referred to as "suggestive relaxation."⁷ In optometry, hypnosis is used as an aid in many areas including contact lenses, vision therapy, low vision, and ocular pathology.²

It has been documented that hypnosis can cause an improvement in visual acuity in myopes.^{1,3,6,7} The mechanism of such improvement is not known. Many possible causes have been examined and subsequently eliminated: Alteration of refractive power,^{4,5,6} pupil constriction,⁴ increased blur interpretation⁸ and memorization.⁶ Graham and Leibowitz state that the mechanism of visual acuity improvement "cannot be fitted neatly into the traditional schema of a casual relationship among factors in the peripheral visual anatomy."

What, then, is the cause of hypnotic visual acuity increases? Most investigations have studied relaxation alone. Graham and Leibowitz studied the effect of the combination of relaxation and hypnotic suggestion. Both types of studies resulted in improved visual acuity. The purpose of this study was to distinguish between the inclusion and exclusion of a hypnotic suggestion in the suggestive relaxation procedure. That is, what is the effect of the specific hypnotic suggestion of "clearer vision" on unaided visual acuity?

METHODS

1. Subjects

The subject population consisted of 53 adults (36 males and 17 females) between the ages of 22 and 31. Most subjects were drawn from the Pacific University College of Optometry student population. Subjects were told that the purpose of the experiment was to study the effects of relaxation on visual acuity. All subjects were myopes with refractive errors between 1 and 9 diopters with 2 diopters or less of refractive cylinder and correctable to at least 20/20 in each eye. Objective and subjective refractions done prior to and following the induction

procedure made it possible to monitor refractive changes and to eliminate any pseudo-myopes. True myopia is indicated when close agreement exists between the subjective and objective measurements, i.e. within 0.50 diopters.⁶ Contact lens wearers were not allowed to wear their lenses 24 hours prior to being involved in the study. This was done to minimize acuity fluctuations resulting from corneal changes.

2. Methods and Materials

Several general examination rooms in the Pacific University Optometric Clinic were utilized for conducting the experimental procedure. Each room was similar in size and the equipment used was identical. Lighting was controlled and standardized. Acuity measurements were taken using illuminated Snellen visual acuity charts. Routine objective and subjective refractions were standardized and performed.

Cassette tapes were used to standardize the induction process and minimize procedural differences between subjects. In order to determine the suggestibility of each subject one tape was made which involved the use of a hand separation suggestibility scale. This consisted of instructions to relax, close eyes, and outstretch arms with palms up. Suggestions were then made that on one hand was a 10 pound bag of sugar and that the other hand was tied to a helium balloon. After playing the tape a measurement of the vertical distance between hands was made.

A second tape was designed to induce a general state of relaxation. A third tape was designed identical to the general relaxation tape with an added specific suggestion of improved vision.

The following sequence of tests was run on each subject: 1) Static retinoscopy at far, 2) Binocular subjective refraction - maximum plus to best visual acuity, 3) Hand separation suggestibility tape, 4) Binocular unaided visual acuity (a 50% correct criterion was used).

The subject population was then divided into three groups. Each group was assigned members by considering each subject's suggestibility (as determined by the hand separation test) and degree of myopia. This was done to assure an even distribution of myopia and suggestibility. The control had 19 subjects, experimental group 1 had 16 and experimental group 2 had 19.

The control group was only instructed to relax with eyes closed for a period of time. They heard no relaxation tape. Experimental group 1 heard the general relaxation tape. Experimental group 2 heard the general relaxation and specific suggestion of improved visual acuity tape. Time allowed for relaxation was the same for each group.

Next all subjects were run through the final three steps: 5) Static retinoscopy at far, 6) Binocular subjective refraction - maximum plus to best visual acuity, 7) Binocular unaided visual acuity.

The experimenters discouraged tendencies on the part of the subjects to squint or move his/her head. Every effort was made to obtain an accurate measure of the subject's maximum visual acuity.

RESULTS

The problem of how to evaluate an actual change in visual acuity on an accurate quantitative basis is difficult. The simplest method is merely the number of lines improvement as measured on the ordinary Snellen chart. This, however, presupposes that the difference between each line is the same which is obviously untrue. To assure statistical validity and to make acuity improvement comparisons between high and low myopes more meaningful, all acuities were converted to log arc minutes. (Had the data been left in arc minutes an improvement from 20/40 to 20/20 would have been equal to that from 20/400 to 20/380.) After statistical analysis log arc minutes were reconverted to Snellen acuities to demonstrate clinical relevance.

All three groups showed mean acuity increases significant to the .005 level (table 1). Differences in acuity improvements between control and experimental group 1 and control and experimental group 2 were found significant to the .005 level, but no significant difference existed between the two experimental groups (table 2). Snellen notation of the mean acuity increase within groups is found in table 3.

Finally for comparison purposes Snellen acuity was converted to percent of vision (table 4). These values of improvement are found to roughly correlate with those of arc minutes.

DISCUSSION

Significant improvement of unaided visual acuities were found within the three subject groups. Even the control group which had no relaxation induction procedure demonstrated a significant acuity increase. Acuity improvement in the control group can probably be attributed to procedure familiarity, subjects' loss of anxiety toward the examination process, improved ability to interpret acuity charts with repetition, and the subjects' ability to attain a relaxed state on his/her own. This finding indicates a potential for improved acuity by merely relaxing oneself.

Acuity improvements were significantly better in the experimental groups compared to the control. This suggests hypnotic induction designed to deepen the state of relaxation can improve unaided acuity.

When a specific suggestion of better vision was added to the relaxation induction there was not a significant change in acuity improvement compared to relaxation induction alone.

The depth of hypnosis is very difficult to objectively evaluate. No attempt was made in this study to measure the subjects' depth of hypnosis. The various levels of hypnotic suggestibility were evenly distributed into the three groups. Since the induction procedure was the same for experimental groups 1 and 2 the authors hoped to gain equivalent depths of hypnosis between the two. Therefore any change of acuity improvement in experimental group 2 could be directly attributed to the hypnotic suggestion of better vision. Since depth of hypnosis was not measured it is not known if it had an effect on amount of acuity improvement. There did not appear to be a correlation between the amount of suggestibility and magnitude of acuity increase.

"The majority of studies in the area (of improved vision via hypnosis) report no change in refractive power which is consistent or large enough to account for the obtained improvement."⁶ This study is no different. Static retinoscopy done before and after the induction showed no significant refractive changes. Objective and subjective refractive error measurements before and after induction eliminated pseudo-myopes.

Many patients indicated they could see clearest immediately after the induction procedure upon first opening their eyes. The method of this study did not call for refractive measurement at this point, so the

explanation for the clearer vision is not known. To the authors' knowledge no study has been done using refractive measurements immediately after the subjects open their eyes. The use of the laser scintillation refractive technique⁶ would be a possible way to help resolve this question.

Subjects reported other periods of clearer vision occurring while post-induction acuities were taken. Clearer vision seemed to fade in and out in irregular cycles. This has been observed in previous studies and as yet no satisfactory explanation has been offered.

In this study the high myopes (6-9 diopters) were able to attain the least amount of acuity improvement in relation to lower myopes. Other studies have found that the high myopes attain the greatest amounts of improvement.^{6,10} It is possible that findings have been similar in all studies but due to varying methods of calculating acuity improvements differing results have been obtained. In the present study converting Snellen to arc minutes then arc minutes to log arc minutes gave a linear scale of comparison and permitted a sound basis for statistical analysis.

A source of variance in taking acuities of the high myopes was testing distance. Because of the limitations of letter sizes at 10 feet it became necessary to move the acuity charts to 5 feet. The proximal effect may have made it difficult for the subject to keep accommodation relaxed. Some subjects made statements to this effect.

The areas covered in this study have clinical relevance to patient and practitioner. By relaxation, myopes can momentarily improve vision without correction. These significant visual acuity improvements appear not to be related to optical variation in the eye but more to general relaxation of the body. Therefore stress and tension appear to affect the way one sees. Perhaps stress management techniques such as yoga, transcendental meditation, hypnosis, biofeedback, etc. could be of value by allowing improvement of unaided sight.

In the office, relaxation techniques used during unaided visual acuity tests will improve the findings. This could lead to a prescription of less minus than is currently being prescribed. Vision therapy dealing with overstimulation such as accommodation excess and convergence excess could include relaxation procedures.

SUMMARY

This study demonstrated acuity improvements among subjects submitted to a general hypnotic relaxation greater than improvements found in a matched control group. Refractive changes do not explain these improvements. A specific suggestion of improved sight added to hypnotic relaxation had no significant effect on acuity improvements. Relaxation techniques should be considered by vision specialists as an aid in determining myopic prescriptions and in vision training. Although the physiologic mechanism of improved vision through hypnosis is not known, general body relaxation appears to be a major factor.

TABLE 1

	mean improvement (arc min.)	"t" value	Significance
Control	1.2	3.323	.005
Exp 1	3.44	6.937	.005
Exp 2	4.35	5.918	.005

TABLE 2

	"t" value	Significance
Control/Exp 1	2.76	.005
Control/Exp 2	3.18	.005
Exp 1/Exp 2	1.09	.100

TABLE 3

	pre acuity	post acuity
Control	20/120	20/95
Exp 1	20/170	20/105
Exp 2	20/190	20/105

TABLE 4

	mean % of vision increase	mean arc minute increase
Control	7.37%	1.2
Exp 1	16.00%	3.44
Exp 2	16.90%	4.35

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